

**The claims defining the invention are as follows:**

1. An intelligent device (9) for a power line communication system (100) that has stored in memory (903) information uniquely specifying the identity of the intelligent device (9) and includes an interface (906) for data communication with a power line and is operable to perform a configuration process including the steps of using said interface (906) to:
  - a) detect data of a first data type (WCHM packets) through the interface and in response thereto extract from the data of a first data type (WCHM packets) and record in memory identity information for the source of the data of a first data type (WCHM packets) and generate on said interface (906) data of a second data type (IHY packets) that have as a destination address the source of the data of a first data type (WCHM packets) and includes the information specifying the identity of the intelligent device (9);
  - b) detect data of a second data type (IHY packets) that have the intelligent device (9) as a destination address and in response thereto extract from the data of a second data type (IHY packets) and record in memory the identity of the source of the data of a second data type (IHY packets) and generate on said interface (906) data of a third data type (IHT packets) that includes information identifying the source of the data of a second data type (IHY packets) and the information specifying the identity of the intelligent device (9);
  - c) detect data of a third data type (IHT packets) and in response extract there from and record in memory information identifying the source of the data of a third data type (IHT packets) associated with the information identifying the source of the data of a second data type (IHY packets) included in the data of a third data type (IHT packets) and generate data on said interface (906) containing the information identifying the source of the data of a third data type (IHT packets), the information identifying the source of the data of a second data type (IHY packets) included in the data of a third data type (IHT packets) and the information specifying the intelligent device's identity.
2. The intelligent device of claim 1, wherein the data generated in step c) is addressed to at least one source of data detected in step a).
3. The intelligent device of claim 2, wherein the steps of extracting and recording in step c) are only performed for data of a third data type that are addressed to the

intelligent device.

4. The intelligent device of any one of claims 1 to 3, wherein the address of the intelligent device is the same as the information specifying the intelligent device's identity.  
5
5. The intelligent device of any one of claims 1 to 4 further operable to determine an indicator of the quality of communication between itself and the source of detected data and rank identity information recorded in memory dependent on said indicator.  
10
6. The intelligent device of any one of claims 1 to 5, operable to in response to detection of data of a second data type generate data of a fourth data type including as a destination address the source of the data of a second data type and the configuration process may further include the steps of using said interface to detect data of a fourth data type that have the device as a destination address and in response thereto generate on said interface data of a first data type.  
15
7. The intelligent device of any one of claims 1 to 6, operable to ignore detected data of a second data type that were generated by a source that was recorded in memory as a source of data of a first data type in in step a).  
20
8. The intelligent device of any one of claim 1 to 7, operable to use said interface to generate data of a first data type and wherein the data of a first data type include a counter, wherein step a) further includes identifying the value of the counter of any data of a first data type detected, associate the value of the counter with the recorded identity information for the source of the data of a first data type, increment the value of the counter and allocate the incremented value to a counter in any data of the first data type generated by the intelligent device as a result of data received from the source of the data of a first data type.  
25  
30
9. The intelligent device of claim 8, operable to ignore detected data of a first data type that has a counter value more than a threshold value.
- 35 10. The intelligent device of claim 9, wherein the threshold value is a value related to the value of the counter from the last data of a first data type received.

11. The intelligent device of claim 10, wherein the threshold value is one more than the value of the counter from the last data of a first data type received.
- 5 12. The intelligent device of any one of claims 1 to 11, wherein the data of a third data type include a counter and the data generated in step c) is in the form of data of a third data type and the intelligent device associates the value of the counter with the information recorded in step c) that identifies the source of the data of a third data type and the intelligent device increments the counter when generating data of a third data type in response to detection of data of a third data type in step c).
- 10 13. The intelligent device of any one of claims 1 to 12, operable to also generate data onto said interface otherwise than in accordance with the configuration process.
- 15 14. The intelligent device of any one of claims 1 to 12, operable to generate text messages onto said interface.
- 15 15. The intelligent device of any one of claims 1 to 12, operable to receive control messages through said interface and communicate control messages to a power distribution board to facilitate load shed dependent on said control messages.
- 20 16. A power line communication system (100) including a plurality of power lines (7a-c) in communication with a controller (3) through a power line modem (6), each power line having a plurality of intelligent devices as claimed in claim 1 in communication with it, wherein the controller (3) is operable as one of said plurality of intelligent devices (9) and is also in communication with a computer controller (2) that is operable to receive data from the intelligent devices (9) via the controller (3) and to send data to the intelligent devices (9) via the controller (3).
- 25 17. The power line communication system of claim 16, wherein data other than configuration data, which is generated onto a power line by an intelligent device or the controller, includes a destination address and an intermediate address, wherein each intelligent device monitors communications on the power line and if the destination address of communications matches information identifying the source of the data of a second data type (IHY packets) included in the data of a third data type (IHT packets) that was recorded by an intelligent device in
- 30 35

accordance with step c), then that intelligent device regenerates the data, but with the intermediate address field comprising the information identifying the source of the data of a third data type (IHT packets) recorded in step c) that is associated with the information identifying the source of the data of a second data type (IHY packets) included in the data of a third data type (IHT packets) that matches the destination address.

5

10

15

18. A power line communication system (100) including a plurality of intelligent devices (9) in communication with a power line and operable to monitor energy usage at a site and communicate usage data onto the power line, and a controller (3) also in communication with the power line, wherein each intelligent device (9) maintains a routing table identifying a first set of other intelligent devices (9) downstream of it relative to the controller (3) that it can communicate with directly and identifying a second set of other intelligent devices (9) downstream of it relative to the controller (3) that it can communicate with through one or more of the first set of other intelligent devices (9).

20

19. The power line communication system of claim 18, wherein the routing table further identifies a third set of other intelligent devices upstream of it relative to the controller that it can communicate with directly.

25

30

20. The power line communication system of 18 or claim 19, wherein the routing tables are formed by an interrogation process initiated by the controller that requests the intelligent devices that can receive data directly from the controller over the power line to respond with information identifying what other intelligent devices the intelligent devices that can receive data directly from the controller over the power line can communicate with either directly or through further intelligent devices, wherein the intelligent devices that can be communicated with through said further intelligent devices are identified through an interrogation process conducted by said further intelligent devices.